

Abstract

A scheduler apparatus provides bandwidth guarantees to individual data packet flows as well as to aggregations of those flows (referred to as “bundles”) in a completely transparent manner, i.e., without using any additional scheduling structure. For each bundle, the scheduler determines the ratio between the bandwidth nominally allocated to the bundle and the sum of the individual bandwidth allocations of the flows that are currently backlogged in the bundle. The scheduler uses that ratio to modulate the timestamp increments that regulate the distribution of bandwidth to the individual flows. In this manner, the greater the ratio for that bundle, the more the bandwidth that each backlogged flow in the bundle receives.

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